

## **WHAT IS CLAIMED IS:**

1. An electronic valve actuator, comprising:
  - an armature;
  - a valve; and
  - a coupler for coupling the armature to the valve with motion of the armature in one direction moving the valve in a different direction.
2. The electronic valve actuator wherein the coupler is a hydraulic coupler.
3. The electronic valve actuator recited in claim 2 including an electromagnet coupled to the actuator.
4. An electronic valve actuator, comprising:
  - an electromagnet;
  - an armature disposed adjacent to the electromagnet;
  - a fluid-containing chamber having:
    - a first piston providing a first wall portion of the chamber; and
    - a second piston providing a second wall portion of the chamber;
  - wherein the first piston is coupled to the armature and the second piston is coupled to a valve; and
  - wherein activation of the electromagnet moves the first piston in a first direction, such motion of the first piston in the first direction driving fluid in the chamber to move the second piston in an opposite direction.
5. The actuator recited in claim 4 wherein the first wall portion has a surface area different from the surface area of the second wall portion.
6. An electronic valve actuator, comprising:
  - a pair of electromagnets;
  - an armature disposed in a magnetic field produced by the pair of electromagnets;
  - a fluid-containing chamber having:

a first piston providing a first wall portion of the chamber; and  
a second piston providing a second wall portion of the chamber;; and  
wherein the first piston is coupled to the armature and the second piston is coupled to  
a valve;  
a pair of springs,  
wherein the armature and the first one of the pair of pistons coupled thereto are  
disposed to move in the first direction upon activation of a first one of the pair of  
electromagnets thereby compressing a first one of the pair of springs, movement of the first  
one of the pair of pistons causing fluid to move the second one of the pistons in the second  
direction thereby expanding the second one of the pair of springs, the first and second pair of  
the springs being held in compression and expansion, respectively, until deactivation of the  
first one of the electromagnets, the first one of the pair of springs being disposed to expand  
after deactivation of the first one of the electromagnets thereby urging the first one of the pair  
of pistons to move in the second direction, movement of the first one of the pistons in the  
second direction resulting in fluid in the chamber urging the second piston to move in the  
first direction resulting in expansion and compression of the first and second springs,  
respectively, the first and second springs being held in expansion and compression,  
respectively, until deactivation of the first one of the pair of electromagnets.

7. The actuator recited in claim 6 wherein the first wall portion has a surface area different  
from the surface area of the second wall portion.

8. The electronic valve actuator recited in claim 6 including a valve disposed in the wall of  
the fluid-containing chamber for enabling such chamber to receive fluid when pressure of  
such chamber is lower than pressure from engine feed lines and to inhibit removal of such  
fluid from the chamber when pressure of such chamber is greater than pressure from engine  
feed lines.

9. The electronic valve actuator recited in claim 8 including a second fluid-containing  
chamber providing a conduit for fluid therein to pass between an outer surface portion of the  
first piston and an outer surface portion of the second piston as the first and second pistons  
move in response to activation of the first and second ones of the pair of electromagnets.

10. The electronic valve actuator recited in claim 9 wherein the fluid in the second chamber passes to the first-mentioned fluid-containing chamber through a valve.

11. The actuator recited in claim 6 wherein the first wall portion has a surface area different from the surface area of the second wall portion.

12. A method for operating an electronic valve actuator having an armature and a valve, comprising coupling the armature to the valve with motion of the armature in one direction moving the valve in a different direction.